Package 'wSVM'

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Title Weighted SVM with boosting algorithm for improving accuracy

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Description We propose weighted SVM methods with penalization form. By adding weights to loss term, we can build up weighted SVM easily and examine classification algorithm properties under weighted SVM. Through comparing each of test error rates, we conclude that our Weighted SVM with boosting has predominant properties than the standard SVM have, as a whole.

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wSVM-package *Weigthed SVM with boosting algorithm for improving accuracy*

Description

We propose weighted SVM methods with penalization form. By adding weights to loss term, we can build up weighted SVM easily and examine classification algorithm properties under weighted SVM. Through comparing each of test error rates, we conclude that our Weighted SVM with boosting has predominant properties than the standard SVM have, as a whole.

Details

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LazyLoad:	yes

Author(s)

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See Also

wsvm, wsvm.predict, wsvm.boost

mixture.example *mixture example*

Description

example of mixture data

Source

Freidman, Tishirani, Hastie (2000). Elements of Statistical Learning, Springer.

wsvm *Weighted SVM with boosting algorithm for improving accuracy*

Description

Compute Weighter SVM with boosting algorithm

Usage

```
wsvm(X, Y, c.n, kernel = list(type = 'linear', par = NULL), C = 1, eps = 1e-10)
```

Arguments

X	input variable matrix. Data type must be a matrix format.
Y	output variable vector which will be declared as a matrix in SVM. Data type must be a matrix format.
c.n	weighted term.
kernel	set an attributes of kernel using list(). kernel$type means a type of kernel, including 'linear', 'poly', and 'rbf'. kernel$par means a parameter of kernel. For example, par = degree for 'poly' and par = scale for 'rbf'.
C	regularization parameter.
eps	epsilon value.

Details

Weighted SVM with boosting algorithm for improving accuracy.

Value

A function wsvm generate a list consists of fit, alpha, bias and sv.
model$fit = predicted values (n by 1)
model$alpha = estimated coefficients (n by 1)
model$bias = bias term
model$sv = index of support vectors

Author(s)

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See Also

wsvm.predict, wsvm.boost

Examples

```
# generate a simulation data set using mixture example(page 17, Friedman et al. 2000)

svm.data <- simul.wsvm(set.seeds = 123)
X <- svm.data$X
Y <- svm.data$Y
new.X <- svm.data$new.X
new.Y <- svm.data$new.Y

# run Weighted K-means clustering SVM with boosting algorithm
model <- wsvm(X, Y, c.n = rep(1/ length(Y),length(Y)))

# predict the model and compute an error rate.
pred <- wsvm.predict(X,Y, new.X, new.Y, model)

Error.rate(pred$predicted.Y, Y)

# add boost algorithm

boo <- wsvm.boost(X, Y, new.X, new.Y, c.n = rep(1/ length(Y),length(Y)),
    B = 50, kernel.type = list(type = "rbf", par= 0.5), C = 4,
    eps = 1e-10, plotting = TRUE)
boo
```

`wsvm.boost` *Weighted SVM using boosting algorithm*

Description

Improve accuracy for learning algorithm to bond with a lot of weak classifiers to construct the only one strong classifier.

Usage

```
wsvm.boost(X, Y, new.X, new.Y, c.n, B = 50, kernel.type = list(type = "rbf", par= 0.5), C = 4, eps =
```

Arguments

`X`	input variable matrix to generate kernel. Data type must be a matrix format.
`Y`	output variable vector which will be declared as a matrix in SVM. Data type must be a matrix format.
`new.X`	test predictors.
`new.Y`	test response.
`c.n`	weighted term.
`B`	the number of iterations.

kernel.type	set an attributes of kernel using list(). kernel$type means a type of kernel, including 'linear', 'poly', and 'rbf'. kernel$par means a parameter of kernel. For example, par = degree for 'poly' and par = scale for 'rbf'.
C	regularization parameter.
eps	epsilon value.
plotting	logical values. If TRUE, plot the result.

Value

A function wsvm.boost generates a list consists of error.rate and predicted.model.

error.rate	misclassification error rate
predicted.model	predicted model

Author(s)

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References

SungWhan Kim (2010). Weighted K-means SVM with Boosting algorithm for improving accuracy, Master Thesis, Korea University.

See Also

wsvm, wsvm.predict

Examples

```
# generate a simulation data set using mixture example(page 17, Friedman et al. 2000)

svm.data <- simul.wsvm(set.seeds = 123)
X <- svm.data$X
Y <- svm.data$Y
new.X <- svm.data$new.X
new.Y <- svm.data$new.Y

# run Weighted K-means clustering SVM with boosting algorithm
model <- wsvm(X, Y, c.n = rep(1/ length(Y),length(Y)))

# predict the model and compute an error rate.
pred <- wsvm.predict(X,Y, new.X, new.Y, model)

Error.rate(pred$predicted.Y, Y)

# add boost algorithm
```

```
boo <- wsvm.boost(X, Y, new.X, new.Y, c.n = rep(1 / length(Y),length(Y)),
    B = 50, kernel.type = list(type = "rbf", par= 0.5), C = 4,
    eps = 1e-10, plotting = TRUE)
boo
```

`wsvm.predict` *Predict new test set using wsvm function and compute error rate*

Description

Predict a weighted svm fit and compute error rate.

Usage

```
wsvm.predict(X, Y, new.X, new.Y, model, comp.error.rate = FALSE)
```

Arguments

`X`	input variable matrix to generate kernel. Data type must be a matrix format.
`Y`	output variable vector which will be declared as a matrix in SVM. Data type must be a matrix format.
`new.X`	test predictors.
`new.Y`	test response.
`model`	predicted model including alpha and bias terms. The alpha means estimated coefficients(nrow(X) by 1) and bias means bias term.
`comp.error.rate`	logical value. If true, calculate error rate.

Details

Predict a weighted svm fit.

Value

A function wsvm.predict generates a list consists of values, g, and error.rate.

`predicted.values`	fitted value at new.X
`g`	signs of predicted values
`error.rate`	misclassification error rate

Author(s)

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See Also

wsvm, wsvm.boost

Examples

```
# generate a simulation data set using mixture example(page 17, Friedman et al. 2000)

svm.data <- simul.wsvm(set.seeds = 123)
X <- svm.data$X
Y <- svm.data$Y
new.X <- svm.data$new.X
new.Y <- svm.data$new.Y

# run Weighted K-means clustering SVM with boosting algorithm
model <- wsvm(X, Y, c.n = rep(1/ length(Y),length(Y)))

# predict the model and compute an error rate.
pred <- wsvm.predict(X,Y, new.X, new.Y, model)

Error.rate(pred$predicted.Y, Y)

# add boost algorithm

boo <- wsvm.boost(X, Y, new.X, new.Y, c.n = rep(1/ length(Y),length(Y)),
    B = 50, kernel.type = list(type = "rbf", par= 0.5), C = 4,
    eps = 1e-10, plotting = TRUE)
boo
```

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